Science
Department

Delta International Language School (DILS)

Primary 6
2nd Term



Name: ....

Class : 6 / ....

Unit (1)
Lesson (1) Types of levers

Definition of levers:

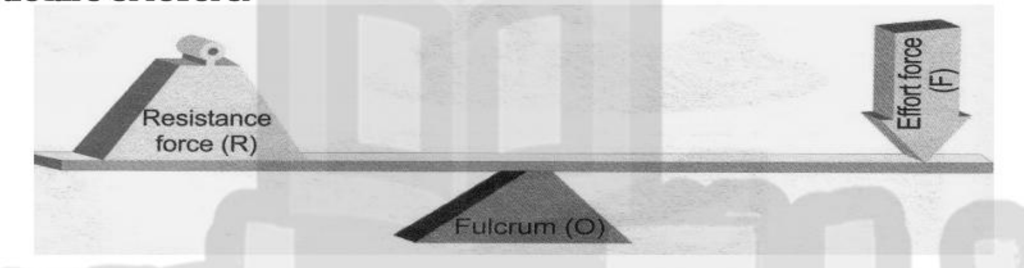
- **Is a rigid bar (strong stalk) that rotates around a fixed point called fulcrum, and is affected by a force and a resistance.**
- **Levers were first described in the year 260 B.C by the Greek scientist Archimedes.**

Give reasons:

☒ **Along time ago, man invented many simple machines?**

To help him perform heavy tasks more easily.

The structure of levers:



- ✓ The fulcrum: **The fixed point that the bar rotates on.**
- ✓ The rigid bar: **May be straight or curved.**
- ✓ The effort: **The force exerted by a person to over come the resistance.**
- ✓ The resistance: **The force resulted from the body we want to move.**

☒ **The function of levers:-**

1- Increasing force:

Some levers allow the conservation of the effort exerted by using small force Like: Nutcracker – Crow bar

3.Wheelbarrow

1.Crowbar



2.Nutcracker



2- Increasing the distance:

Some of levers allow exerting a force for a small distance to make an object move a longer distance.

Like: The manual broom:

Your hand moves small distance at the upper part of the broom, while the lower part moves a longer distance.

3- Increasing speed:

Making the body moves faster.

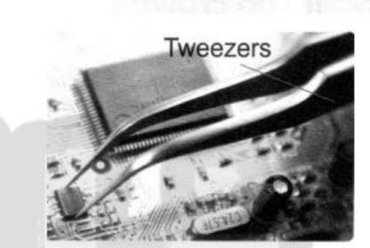
Like the hockey bat.

4- Moving the force from place to another.

Like the manual broom to move the force downwards without bending.

5- Accuracy in performance.

Like: using tweezers to pick up very small objects.



6- Avoid dangers, like heat, cold, poisonous materials.

Like the coal holder.

Discover the importance of the lever.

The machine	Importance	Function
Ice holder Coal holder	Protecting hands	Avoid risks
Tweezers	Capturing very small objects	Increasing accuracy in performance.
A broom	Cleaning floors	Transferring force without bending.
Hockey stick	Moving the ball without bending.	Increasing the speed.
Nutcracker	Cracking nuts.	Increasing the force
Bottle opener	Opening bottles	
Pincer	Cutting wires	
Suction pump	Pumping water	
Crow bar	Separating tool	

Complete the following:

1- ……………are the most common simple machines that help us to make tasks easily.

2- Crowbar, seesaw and wheelbarrow are types of simple machines called……..

3- …………is a rigid bar that rotates around……..……., and is affected by ………………….and an effort force.

4- In the lever, the fixed point (fulcrum) is symbolized by……………while resistance force is symbolized by ……………..

5- ……………….is results from the body that we want to move it.

6- ………………..is exerted by a person to equilibrate the resistance force.

7- Levers help us to perform tasks more easily by ………….,…………and………

8- ……………,…………..and……………are the importance of levers.

9- ……………is example of levers that used to increase force, while ………..is an example of levers that used to increase the distance.

10- ……………..is an increasing speed levers.

11- …………..is a very accurate lever.

Write the scientific term:

1- The fixed point of a rigid bar.

2- A rigid bar that rotate around a fixed point and affected by an effort force and resistance.

Give reasons:

1- Crow bar is considered an increasing force lever.

………………………………………………………………………………………….

2- Tweezers is considered accurate lever.

………………………………………………………………………………………….

3- Levers are very important in our daily life.

………………………………………………………………………………………….



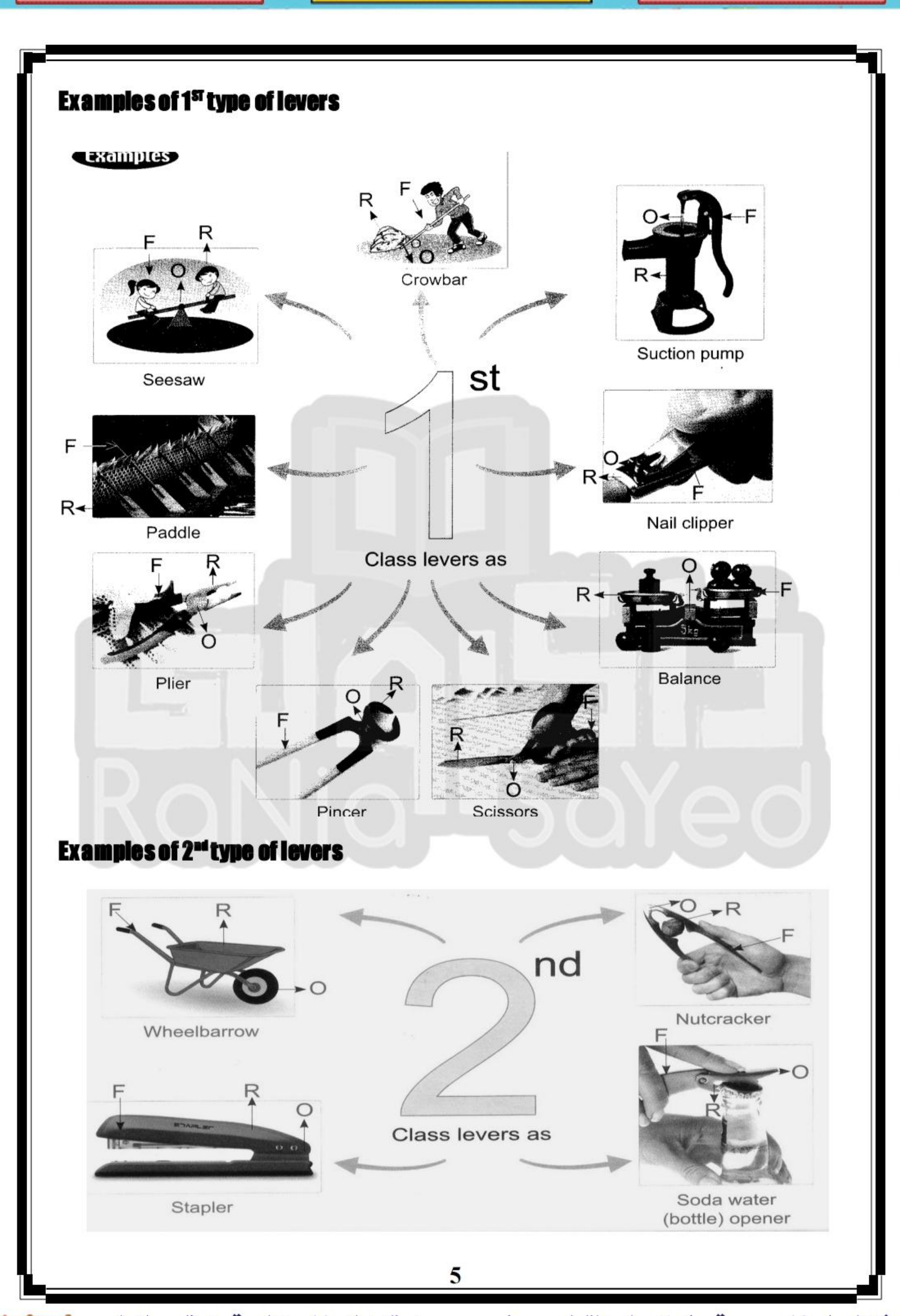
Types of levers

Levers are classified according to the position of resistance, fulcrum and effort.

1st Class lever	2nd Class lever	3rd Class lever
Class 1 Lever: Load, Fulcrum, Effort	Class 2 Lever: Load, Fulcrum, Effort	Class 3 Lever: Load, Fulcrum, Effort
The Fulcrum between the Effort and the Resistance.	The Resistance is between the Effort and the Fulcrum.	The Effort is between the Resistance and the Fulcrum.
- See – Saw - Crow bar - Scissors - Water pump - Boat arms - Pincer - Hammer - Scale – Balance	- Wheel barrow - A bottle opener - Nut cracker - stapler	- Fish pale - Manual broom - Ice holder - Tweezers

Remember




Examples of 1ST type of levers
Examples
R
F
O
Crowbar
O
F
R
Suction pump
F
R
O
Seesaw
1st
Class levers as
F
R
Paddle
O
R
F
Nail clipper
F
R
O
Plier
O
R
F
Balance
O
R
F
Pincer
F
R
O
Scissors
Examples of 2nd type of levers
F
R
O
Wheelbarrow
O
R
F
Nutcracker
2nd
Class levers as
F
R
O
Stapler
F
O
R
Soda water
(bottle) opener

Examples of 3rd types of levers

3rd Class lever: as

- O, F, R — Tweezers
- O, F, R — Manual broom
- R, F, O — Hockey bat
- R, F, O — Fishing tool
- O, F, R — Ice or sweet or coal holder

Complete the following:

1- …………….are levers that have fulcrum between the effort force and the resistance force.

2- ……………….and…………….are examples of the first class levers.

3- ……………are levers that have the resistance force between effort force and fulcrum.

4- …………and…………are examples of the second class levers.

5- Stapler and wheelbarrow have the …………between fulcrum and……….

6- …………and…………..are examples for third class levers.

7- The nutcracker is an example of the …………levers.

8- The manual broom is an example of the …………..levers.

9- The scissors is an example of the …………levers.

Give reasons:

1- Crowbar, suction pump and paddle are first class levers.

……………………………………………………………………………………………

2- Bottle opener and stapler are second class levers.

……………………………………………………………………………………………

3- Hockey bat and fishing tool are third class levers.

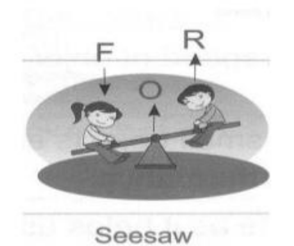
……………………………………………………………………………………………

Classify the following levers:

Crowbar – Nutcracker – Wheelbarrow – Bottle opener – Suction pump – paddle – Balance – Scissors – pincer – plier – Stapler – fishing tool – tweezers – hockey bat – ice holder – Manual broom.

First class lever	Second class lever	Third class lever
…………………………	…………………………	…………………………
…………………………	…………………………	…………………………
…………………………	…………………………	…………………………
…………………………	…………………………	…………………………
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…………………………	…………………………	…………………………
…………………………	…………………………	…………………………

Lesson (2) Law of Levers



Seesaw



Wheelbarrow



Fishing tool

From the previous pictures, we conclude that:

Any lever has:

1- Force (F)

2- Resistance (R)

3- Fulcrum (o)

4- Effort arm.

5- Resistance arm.

☒ **The force arm:-**

The distance between the force and fulcrum.

☒ **The resistance arm:-**

The distance between the resistance and fulcrum.

❖ **The law of levers:-**

The force x its arm = The resistance x its arm

The effort force or resistance force is inversely proportional to its arm.

a) When the arm of force = The arm of resistance

- The force and the resistance are equal.

Force = Resistance ⟹ Force arm = Resistance arm.

b) When the arm of force is larger than the arm of resistance

- The force is smaller than the resistance.

And the lever conserves the effort.

Force < Resistance ⟹ Force arm > Resistance arm.

c) If the arm of force is shorter than the arm of resistance.

The force is longer than the resistance.

The lever doesn't conserve the effort.

Force > Resistance ⟹ Force arm < Resistance arm

Complete the following:

1- The law of levers states that……………………….

2- The arm of force is the distance between …………and…………..

3- Force arm X its arm = ……………….X……………….

4- When the force arm equals 5 m. and the resistance arm equals 1 m. so ……………….is larger than……………..

5- The effort force is ……………..proportional to its arm.

6- The effort force is measured by …………….

7- The resistance arm is measured by ……………..

8- The force and resistance are equal in levers if ……………………….

9- The effort force is larger than the resistance force when…………………is longer than……………………

Examples:-

1- Study the figure then calculate the weight of the rock.

The answer:

Force x its arm = resistance x its arm

10 x 6 = Resistance x 2

*** Resistance = 60 ÷ 2 = 30 Newton**

2- Second class lever, force = 200 Newton. Force arm = 5 cm, calculate the resistance arm, When the resistance = 100 N.

Force x its arm = Resistance x its arm

200 x 5 = 100 x Resistance arm

*** Resistance arm = 1000 ÷ 100 = 10 cm**

3- Lever affected by 500 Newton force and arm length is 20 meter and also affected by 1000 Newton resistance, and its arm length is 5 m , is the lever at equilibrium? And why?

The lever is in equilibrium when the lever law is established:
Force x its arm = 5000 x 20 = 10000 Newton. Meter
Resistance x its arm = 10000 x 5 = 50000 Newton. Meter
Science the two magnitudes are not equal.
The lever is not at equilibrium.

Problems

1- The exerted force of the first class lever equals 500 Newton and the length of its arm is 20 cm. and is affected by a resistance with a value of 200 Newton, find the length of the arm of the resistance.

……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………

2- The length of the force arm of a first class lever is 5 cm. and the length of resistance arm is 15 cm. if the resistance has a value of 300 Newton, calculate the value of effort force.

……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………

3- The affecting force on a second class lever equals 200 Newton and the length of its arm is 50 cm. if the value of the resistance 1000 Newton calculates the value the resistance arm.

……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………

What are the levers that conserve effort:-

The lever conserves effort if the force is smaller than the resistance. And the force arm is more than the resistance arm

First class levers:-

As the fulcrum lies at the middle, we have three possibilities:-

The Force arm is Larger than the Resistance arm	The force arm Is equal to The resistance arm	The Force arm is Shorter than the Resistance arm
The force / The resistance	The force / The resistance	The force / The resistance
The lever conserves effort. Has mechanical benefit. The force is smaller than resistance.	The force is equal to resistance. The lever doesn't solve effort. No mechanical benefit.	The force is larger than the resistance. The lever doesn't conserve effort. Has no mechanical benefit.

G.R.

The force and resistance can be equal only in the first class levers.

……………………………………………………………………………………

Complete:

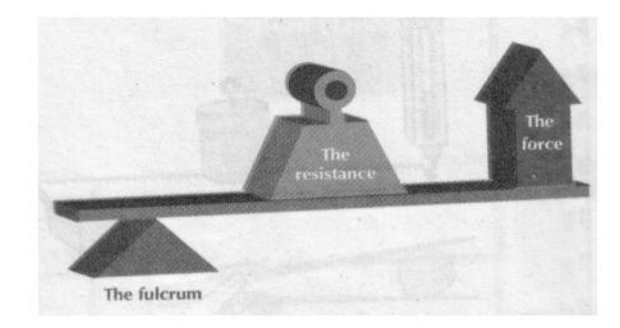
1- The lever conserves effort when…………..is longer than…………..

2- The only type of levers, where the arm of force and the arm of resistance are equal is the…………………

3- There is a conservation of effort in the first class levers if…………………is longer than………………or when………………..

4- In the first class levers, when the effort force is…………..the resistance force, the lever has a mechanical benefit.

The second class lever:-



G.R

1- It always conserves effort and has mechanical benefit.
Because the force arm is always larger than the resistance arm.

2- The force doesn't equal the resistance in the 2nd class lever.

……………………………………………………………………………………

3- In the 2nd class lever, the force is always less than the resistance.

……………………………………………………………………………………

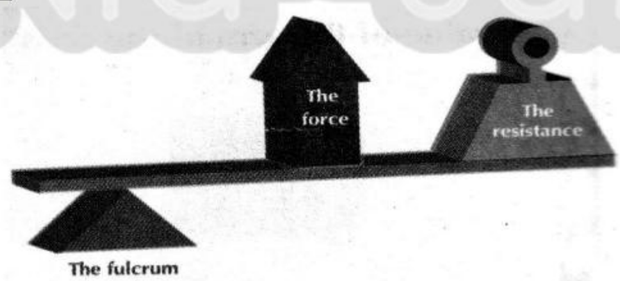
Complete the following:

1- The second class levers have a mechanical benefit, because ………is longer than ………………

2- Wheelbarrow has a mechanical benefit as it is …………………..

3- In stapler and nutcracker, the…………..is longer than……………..

The 3rd class lever:-



G.R

✓ **The 3rd class lever doesn't conserve effort, have no mechanical benefit**

Because, the arm of resistance is larger than the arm of the force, so the effort force is always larger than resistance.

- The machines that doesn't conserve effort are useful to increase speed, distance and to save time.

A) Complete:

1- Tweezers and claw hammer haven't mechanical benefit, because ………………..is shorter than…………………

2- …………..don't conserve effort, because the arm of resistance is always longer than the arm of effort force.

3- In the ……………, the effort force is always smaller than resistance force, while in the …………., the effort force is always larger than the resistance.

4- The type of levers which sometimes saves effort and another tomes doesn't is the ………………….

5- In hockey bat, ………….is smaller than…………., while in the soda water oponer, the ……………is longer than……………

B) G.R.

1- The third class levers are very important in our life although they don't conserve effort.

…………………………………………………………………………………

2- The third class levers always don't conserve effort.

…………………………………………………………………………………

C) Classify the following levers according to the conservation of effort, and then mention the type of lever.


Seesaw


Wheelbarrow

2.Nutcracker





Stapler

Unit (2)
Lesson (1) The Electric Lamps

☒ The sun is the main source of light on earth.
☒ At past: oil lamps, candles were used to get light.
☒ Now torches, candles have disappeared from most countries to be replaced by electric lamps.

❖ Define the Electric Lamp:-
It is a tool converts electric energy to light energy.

❖ Define the Electric Current:-
It's a flow of electric charges (Electrons) through a good electric conductor.

❖ The Advantages of Electric Lamps:-
- A constant source of light.
- Clear and bright.
- Free from smoke, clear, vapor.

❖ The main kinds of Electric Lamps:
1- Light bulbs.
2- Fluorescent lamps.

A) Complete:
1- The ……………..is the main source of light on the earth.

2- ……………….. and……………are from the artificial sources of light that used before inventing electric lamps.

3- Electric lamps convert………………energy into…………energy.

4- Electric current is the flow of…………through a material conducting……..

5- Some types of electric lamps are…………and……………..

B) Write the scientific term:
1- A tool used to convert the electric energy into lighting.

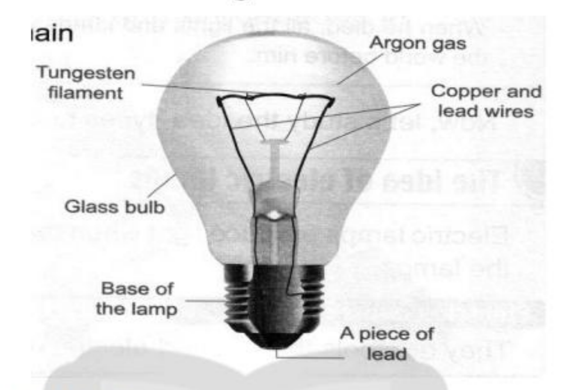
2- The main source of light and energy on earth.

3- The flow of electric charges through a material conducting electricity.

1) The Light Bulbs:-

The most popular source of artificial light.

Examples: Bulbs at home. - Car lights. - Torches.



The Structure of the Light Bulb:-

1- The Filament.

It's a coiled thin wire of tungsten.

Because: - tungsten has a high melting point, glows to emit light.

2- Two copper wires:-

To connect the electric current from the base to the filament.

3- The glass Bulb:-

To prevent air from reaching the filament to protect it from burning.

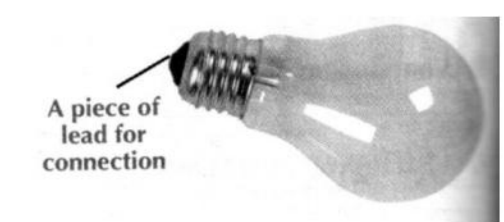
The glass bulb is filled with inert gas. Like argon instead of air to protect the filament from burning.

4- The base of the light bulb:-

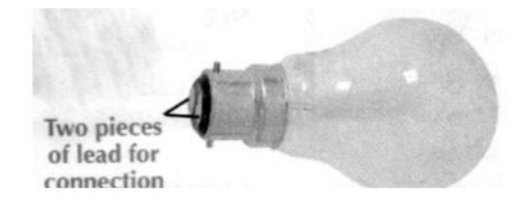
- It carries the lamp up right.
- Connects the lamp with electric circuit.

There are two types of lamp bases which are:

1- Spiral base: it has a piece of lead to connect the lamp to the electric circuit.



2- Two side nails base:
It has two pieces of lead to connect the lamp to the electric circuit.



Complete the following:

1- The light bulb consists of……………..,……..………and…………………

2- The filament of the light bulb is made of……………and that is because it has high………………..

3- The light bulb contains inert …………….gas.

4- The glass bulb of the electric lamp prevents…………..from reaching……….

5- There are two types of lamp bases, ……………base and……………base.

Write the scientific term:

1- A coiled thin wire made of tungsten in light bulbs.

2- A part of light bulb that emits light when electric current passes through it.

3- It carries the lamp upright, positions it in place and connects the lamp to electricity.

Give reasons:

1- The filament of the light bulb is made of tungsten.

………………………………………………………………………………..

2- The glass bulb in the light bulb is filled with inert argon gas.

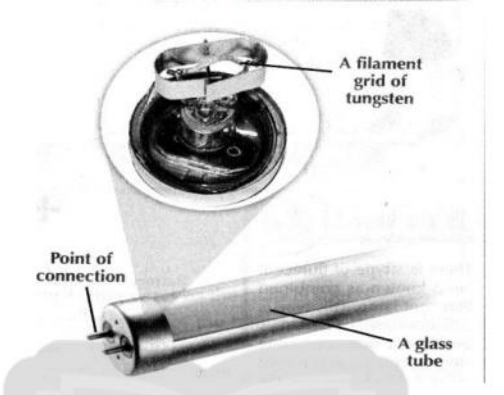
………………………………………………………………………………..

3- There are pieces of lead in the base of light bulb.

………………………………………………………………………………..

2) The Florescent Lamps:-

- Lamps known as neon lamps.
- Used in houses – offices, decorating stores.



The Structure of the Florescent Lamps:-

1- Glass tube:-

- Vacuumed – contains the inert gas (Argon).
- Has a little of mercury.
- The inner tube surface is covered with a phosphoric material.

2- Two filaments of tungsten:-

At the tips of lamp from inside.

3- Points of connection:-

Two points at each tip of the lamp to connect the lamp with electricity.

What happens if?

1- The lamp filament is made of iron.

Iron wire will melt at high temperature.

2- The glass bulb is filled with air.

The filament will burn causing fire.

Complete the following:

1- The fluorescent lamp consists of…………..…,…..………..and…………….

2- The fluorescent lamp contains the inert …………….gas and a little amount of…………………

3- The inner surface of the fluorescent lamp tube is converted with……….material.

Give reasons:

1- There are two points of connection at each tip of fluorescent lamp.

…………………………………………………………………………………..

2- The light bulbs are connected in parallel in the house.

…………………………………………………………………………………..

Connecting the Electric Lamp in the Electric Circuit

The simple electric circuit consists of:-

a) The battery: The electric current source.
b) A lamp.
c) Wires to connect all the circuit components.

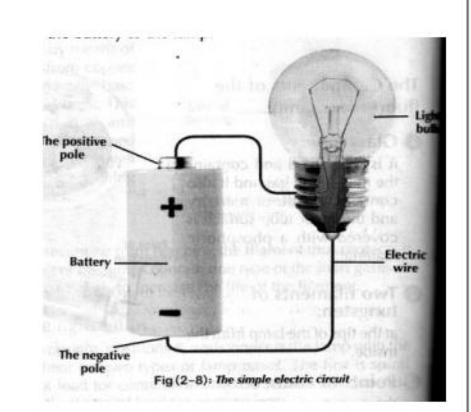


Fig (2-8): The simple electric circuit

Electric circuit:

It is a closed and continuous path through which the electric current will pass making a complete cycle.

Give reasons:

- To pass the electric current in the circuit the circuit must be closed.

To connect all the circuit parts together to allow the electric current to pass.

Methods to Connect the Electric Lamps together

Two ways to connect lamps.

Connecting Lamps in Series	Connecting Lamps in Parallel
The light bulbs are connected one after another.	The electric bulbs are connected in branching routes parallel to each other.
There is one route for the electric current to pass through the circuit.	The electric current has more than one route to pass through the circuit
When we cut one of these routes or one lamp burns all the bulbs are turned off.	When we cut one of these routes, or the lamp burns the electric current moves in other bulbs and they keep lightning.
When the number of the bulbs connected in the circuit increase the lighting of the bulbs decreases.	As the number of bulbs increase the current intensely and lighting of bulbs remains as they are.

❖ Connecting the Electric Lamps in houses

- All lamps in the house are connected in parallel.
- The lamps are connected from the main distributer of energy, but they work independently.
- Each lamp functions alone.
- The turn off or damage of any of the lamps in a room doesn't affect the other rooms.

G.R:- Lamps at home are connected in parallel.

To not turn off all lamps in the home when one lamp turns off or burns.

Complete the following:

1- To light an electric lamp, we need a ………….as a source of electricity and connecting………………

2- The simple electric circuit consists of………..…,……..…..and…………..

3- ……………..and……………..are two ways for connecting electric circuits.

4- When connecting many light bulbs in series, the light intensity of the bulbs………………

5- The electric current in the ………..connection has only one route, while it has many routes in the…………………..

6- All lamps and machines in the house are connected in …………….

7- When connecting light bulbs in …………, the lighting of the lamps decreases by ………….their numbers.

Write the scientific term:

1- A way in which the light bulbs is connected one after the other and the light intensity of the bulbs decreases by increasing their numbers.

2- The way where the bulbs are connected by branching routes.

3- The way where the bulbs are connected and lighting of lamps is not affected by increasing their number.

Lesson (2) Dangers of Electricity and How to deal with it

❖ The importance of electricity.

- Cooking food.
- Preserving it in cold.
- Lighting homes.
- Running machines and factories

❖ Electric Conductors and Insulators.

Electric conductor	Electric insulators
Materials that allow the flow of electricity through them	Materials that don't allow the flow of electricity through them.
like all metals (iron – gold – copper – aluminum)	(Plastic, rubber, wood, glass, clothes).

A) Complete the following:

1- Electricity is used to operate some machines such as …………………,……………..……..and………..………………..

2- Materials are classified into……………and…..………..according to their conductivity of electricity.

3- …………….....and………………are examples of materials that are electric conductors.

4- …………….....and………………are examples of materials that are electric insulators.

B) Write the scientific term:

1- Materials that allow the electric current to pass through them.

2- Materials not allowing the electric current to pass through them.

Dangers of electricity

- Electricity causes many dangers if we neglect the safety precautions or use it in an improper way.

Direct injuries	Indirect injuries
- Fires resulting from electricity. - The electric shock. - Burns resulting from the electric current.	- Caused by electricity but not the direct cause. - The injuries caused by falling of a ladder due to the electric shocks.

❖ **Fires resulting from electricity:**

They are fires occur as result of the increase in the temperature of the electric machines.

❖ **The reasons of electric fires:-**

- Placing an electric machine that generates heat close to some flammable materials like furniture, curtains, rugs and clothes.
- Increasing the load by operating more than one machine from one socket.
- Not disconnecting the electric current from the machines that generate heat after use causing increase in temperature causing burning.

❖ **Compare between regular fire and fire caused by electricity.**

Regular Fire	Fire by Electricity
- Is put off by water	- Can't be put off by water. Because water is good electric conductors, So it will increase the fire. - It put off by using sand.

A) Complete the following:

1- ……………..,……….and……….are some of dangers of the electricity.

2- Placing flammable materials near an electric heater leads to…………….

3- Plugging more than one machine to one socket causes…………….that leads to………………

4- …………………,……………..and……………are some of the causes of the electric fires.

B) Write the scientific term:

1- Fires occur as a result of the increase in the temperature of the electric machines.

2- It occurs when placing flammable materials near to electric machines that generate heat.

3- The material that is used in putting out electric fires.

The Electric shock

The shock is the result of passing the electric current through the human body.

❖ The harms of the electric shock depend on:-

1- The strength of the electric current passing in the human body.
2- The time took for the current to pass in the body.
The electric shock in many times causes death.

❖ The reasons of the electric shock

The electric shock happens when the body is a part from the electric circuit closing it causing the flow of the current in the body.
That happens when:-
a) A part of the body touches a wire that has an electric current and touches the ground.
b) Touching a wire of electric current and touching a material conducting electricity and connected to the ground.
c) When you touch two wires conducting electricity.

❖ Electric burns:

They are burns that resulting from electricity and causes the damage of body tissues.

❖ The reasons of electric burns:

a) Touching a part of the body directly to an electric current source which causes burns.
b) Touching a fire or a spark resulting from the electric fire
c) Touching an electric machine that generates heat (iron, heater) directly.

A) Complete the following:

1- ……….is the result of an electric current passing through the human body.
2- The …………leads to destroying the tissues of the body.
3- …………and…………are some of the causes of the burns resulting from electricity.

B) What happens when?

1- Touching a naked wire, while touching the ground.
……………………………………………………………………………………
2- The spark resulting from the electric fire touches any part of your body.
……………………………………………………………………………………
3- A man touches uncovered wire carrying electric current.
……………………………………………………………………………………

☒ Precaution in dealing with electricity.

a) Don't place several connections in the same socket.

b) Don't insert a metal object in the socket (Nail, screw driver, metal wire).

c) Place a piece of plastic in the socket to prevent inserting any object in it.

d) Don't touch the electric machines that are connected to the electric current with wet hands.

e) Don't leave the heater connected when taking a path.

f) Don't touch any electric machine to fix, clean when they are connected to the current.

g) Don't place the flammable materials (curtains, furniture, clothes, covers, rugs, paper) near to the electric machines that emit heat.
Like (iron, heater and lamp).

h) Don't place electric wires extending on the ground so that one trip on them while walking.

Complete the following:

1- …………..and……………are some of the precautions to deal with the electricity.

2- We should not touch any electric machine with…………..hand.

3- We should place a piece of……………in the electric socket.

4- We should not place the flammable materials such as ………..and………… Near electric machines that generate heat such as…………….and…………..

Unit (3)
Lesson (1) The Solar Eclipse

Remember:-

- Light travels in straight lines as long as there is nothing to prevent it.
- The shadow is a dark area that light doesn't reach it.
- Shadow is formed when a dark body is put in front of a source of light.

Types of shadow

a) The umbra (shadow).
- A completely dark region as no light reaches it.
- It is a dark inner shadow.
- Any one at umbra region can't see the source of light.

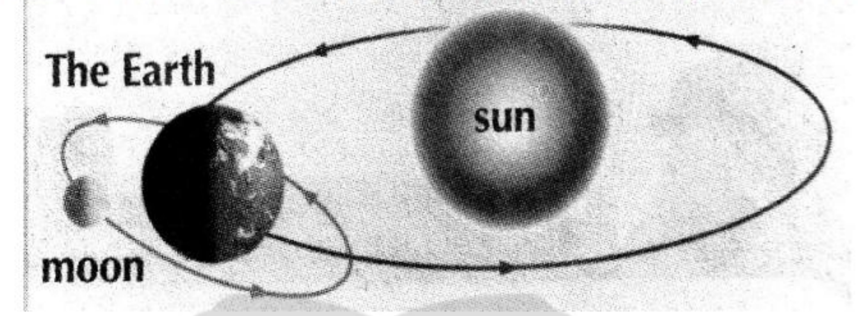
b) The penumbra (semi – shadow).
- It is a faint outer shadow.
- A partially dark region as same light reaches it.
- Any one at penumbra region can see apart of the source of light.



c) Cone shadow:
- It is a dark area formed when the dark object becomes nearer to the light source.
- It doesn't reach to the screen.

Remember:-

- The earth rotates around the sun in a year.
- The moon rotates around the earth in oval orbit in 28 days.
- The earth and its moon revolve around the sun in specific orbits.



Define the solar eclipse:-

- The phenomenon occurs when the earth, the moon and the sun are nearly on one straight line with the moon in the middle.
- The moon shadow hides sun light from a part of the earth.

- **There are three types of solar eclipse according to the moon movement in front of the sun. (G.R.)**

Because, the type of the solar eclipse differs due to the part of the sun that the moon hides during its passage.

Types of solar eclipse:

Total Solar Eclipse	Partial Solar Eclipse	Annular Solar Eclipse
• The earth lies in the shadow area (umbra) of the moon that equal 250 K.M radius • We can't see the sun completely. • The moon has the same size of the sun.	• The earth lies in the semi – shaded area (penumbra) of the moon. • We can see a part of the sun. • The moon is smaller than the sun.	• The sun appears as a lighting ring. • When the moon is in a higher orbit from earth • The cone - shadow doesn't reach the earth.

- **Solar eclipse takes place in the new moon phase at the beginning of lunar month when the moon lies between the earth and the sun.**

☒ **Safety precautions on observing the solar eclipse.**

- The weak glow of the sun during eclipse affects eye and the retina. (G.R.)

Because the outer corona emits harmful rays of Ultraviolet (U.V) and Infra red (I.R) causing blindness in few minuets.

G.R.

You shouldn't look directly to the sun during the solar eclipse.

……………………………………………………………………………………………

A) Complete the following:

1-The …………. rotates around the earth in ………….. shape orbit.

2 - During the solar eclipse the sun emitting harmful rays such as....………..and ……………………

3- In the ………..area of the shadow, the light source can't be seen completely.

4- In the total solar eclipse, the moon appears in…………size to that of the sun.

5- …………is the type of solar eclipse in which the sun disappear completely.

6- In the …………..…….solar eclipse the sun appears as lighting ring.

7- The …………..phenomenon occurs continuously when the …………..hides the sunlight from a part of the earth during its pass in front of it.

B) Write the scientific term:

1- The faint outer shadow of the moon.

2- The inner dark shadow of the moon.

3- The astronomical phenomenon occurs when the earth, the moon and the sun are nearly on one straight line with the moon in the middle.

C) Give reasons:

1- Occurrence of solar eclipse.

……………………………………………………………………………………

2- You should wear special glasses during watching the solar eclipse.

……………………………………………………………………………………

3- The type of solar eclipse differs according to the moon movement in front of the sun.

……………………………………………………………………………………

D) Label the diagram:-

- This picture represents..........................

1- …………………….

2- …………………….

3- …………………….

-Mention the type of solar eclipse occurs at:-

A- ……………………

C- ……………………

B- In the following picture:-

a- Fig (a) represent: - ………………………..

b- Fig (B) represent: - ……………………….

Fig. (1)

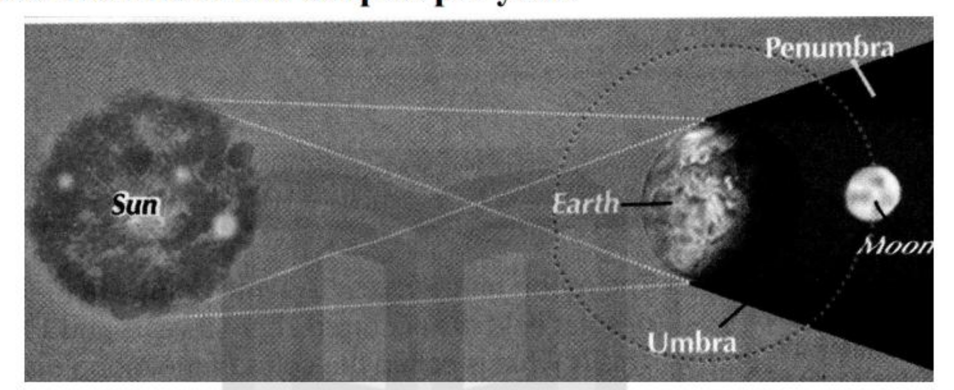
Fig. (2)

Lesson (2) **The Lunar Eclipse**

Definition:-

- The phenomenon occurs in the middle of lunar month when the earth lies between the sun and the moon on one straight line.
- The earth hides the sun light or a part of it from reaching the moon.

Takes place at a rate of two eclipses per year.



Total Lunar Eclipse	Partial Lunar Eclipse	Semi - Shaded Lunar Eclipse
▪ When the whole moon enters the shadow area of earth (umbra). ▪ The color of the moon tends to red and can't be observed from above the earth atmosphere.	▪ When a part of the moon enters the shadow area of the earth (umbra).	▪ When the moon enters the semi – shaded area (Penumbra). ▪ The moon light turns to be faint without eclipse. ▪ The semi – shadow is area at which a part of sun light is hidden from the moon.

Give reasons:

1. During the start of total lunar eclipse the moon colour tends to be red.
Because, there are some red rays aren't absorbed by the earth's atmosphere, these rays are refracted reaching the moon to appear red.

2. There is no annular eclipse.
Because the earth has a great size relative to that of the moon.

Compare between solar and lunar eclipses.

Solar eclipse	Lunar Eclipse
When the moon lies between the earth and the sun.	When the earth comes between the moon and the sun.
Solar eclipse always occurs in the morning.	Can be seen from any point on the earth at night.
Causing blindness and needs precautions from direct looking at it.	Doesn't require precautions or earning to look at it. Have no harms.
Duration doesn't exceed 7 minuets.	Duration is two hours or more.

A) Complete the following sentences:-

1-In the total lunar eclipse the sun, earth and …………….are on one …………. With the ……………………in the middle.

2- ……………… occurs when the …………..comes between the sun rays and a part or whole of the moon.

3- The types of lunar eclipse are ……………..,………………..and ………………

4- The lunar eclipse cycle starts with …………..lunar eclipse then partial lunar eclipse then ……………….lunar eclipse in umbra region.

B) What happen:-

1- The moon lies in the earth's penumbra.

……………………………………………………………………………………

2- Apart of moon lies in the earths umbra.

……………………………………………………………………………………

3- The moon hides a part of the sun from the earth surface.

……………………………………………………………………………………

C) Write the scientific term:-

1- The type of eclipse that can be seen at night only.

2- The phenomenon that occurs in the middle of lunar month.

3- The lunar eclipse which the whole moon enter the earths umbra.

D- Give reason:-

1- The moon is colored red at total lunar eclipse.

……………………………………………………………………………………

……………………………………………………………………………………

2- Occurrence of lunar eclipse.

……………………………………………………………………………………

Unit (4)

Lesson (1)

Absorption and transmission of water and mineral salts in plants

✓ Green plants make its food by a photosynthesis process.
✓ Green plants depend on raw materials in their environment to form their food.

The material	The source
Carbon dioxide gas	- From the air.
Water and mineral salts	- From the soil. - Absorbed through the root hairs that present in their roots
Light	- From the sun. - Absorbed by chlorophyll.
Other elements	- Needed by very little amount like: Phosphorus, Magnesium, Calcium. Nitrogen, Zinc and Other elements.

A) Complete the following:

1- Plants do ……………process to make their own food.

2- Plants use………gas and absorb…………and……..from the soil in the presence of …………to do photosynthesis process.

3- From examples of elements that necessary for plant life are calcium, ………………, …………….. and………..……….

4- Plants absorb water and mineral salts from the soil by……..in their roots.

B) Write the scientific:

1- The vital process by which green plants make their food.

2- The plant parts through which the plant absorbs water and mineral salts from the soil.

☒ **The root system:**

Grows under the soil.

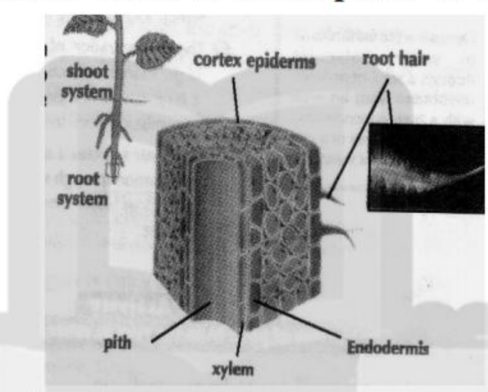


❖ **Importance of root system:**

1- Fixing the plant in the soil.

2- Covering a large area of soil. (G.R.)

- To search for water and mineral salts.
- It absorbs and raises them to other parts of the plant.



❖ **The structure of plant root:**

- Roots are branched and extended through the soil particles.

☒ *By examine a slide of the cross section in the plant root by using microscope we find that the root system consists of :*

A- Number of layers.

B- Root hairs.

A- Number of layers

The layer	The importance
Epidermis layer	- It is the external layer.
Cortex layer:	- The last row of cells in cortex layer is called endodermis (Regulates passing of water to xylem.)
Xylem (wood) layer	- It follows the cortex layer. - It raises the juice to reach the stem and other parts.
Pith layer :	- It is the last layer that follows the xylem layer.

B- Root hairs.

- The structure of root hairs.

A semi-permeable membrane	- Has selective permeability property which allows only some salts to pass through according to the plant's need.
Extend from the root.	- extend from epidermis layer.
Thin layer of cytoplasm	- Lined from inside.
Big vacuoles	- That contain large amount of salt solution.

- **The age of the root hairs does not exceed a few days. (G.R.)** because the skin (epidermis) cells slough from time to time by the resistance of soil particles during extending of the root.

- The Function of root hairs:

1- It is branched (subdivided) and extended between the soils particles.

To fix the plant in the soil.

2- It covers a large area of the soil in order to:

a. Search for water and mineral salts that the plant needs.

b. Absorb water and mineral salts from the soil and raises them to other parts of the plant (shoot system).

☒ The role of root hairs and their and appropriateness (suitability) for absorption of water and mineral salts:

1- They have thin membranes. (G.R)

That allows the penetration of water and salts through them.

2- They have a large number (G.R)

That increases the surface area for absorption of water and salts from the soil.

3- They secrete a sticky substance. (G.R)

That helps the root to penetrate through soil particles

4- The concentration of the salt solution inside their vacuoles is higher than the concentration of the salt solution in the soil. (G.R)

To help in water transport from soil to inside the root by the osmosis.\

High concentration of salts	Low concentration of salts.
- It contains a small amount of water. - It has low concentration of water.	- It contains a large amount of water. - It has high concentration of water.

❖ **Osmosis phenomena:**

It is the transmission of water molecules through semi permeable membrane from an area with high concentration of water to an area of low concentration of water.

(G.R)

❖ **Roots hairs can absorb water from the soil.**

Because, the salt concentration inside their vacuoles is higher than salt concentration in the soil.

- **The path way of water from the soil to all parts of plant:**

Soil – root hairs (through semi – permeable membrane) – Endodermis – xylem – all parts of plant.

A) Complete the following:

1- The outer most layer of a plant root is called…………………..
2- The inner most layer of a plant root is called …………………
3- Root hairs extend from …………..layer of the …………..
4- ……………..system fixes the plant in the soil.
5- Root hairs have a big ………………that contains…………solution.
6- In the plant root, the age of …………does not exceed a few days.
7- Root hairs secrete…………that helps them to penetrate through soil.
8- Root hairs absorb water from the soil through …………phenomena.
9- …………tissue moves water upward to the stem.
10- …………..tissue moves water upward to the stem.

B) Write the scientific term:

1- A structure extends from root wall which absorbs water.
2- The root layer where the root hairs extend from.
3- A structure in plant where water passes through it from root to stem then to leaves.
4- Transmission of water molecules through a semi-permeable membrane from an area with high concentration of water to an area of low concentration of water.

C) Give reasons:

1- Root hairs secrete a sticky substance.

……………………………………………………………………………………

2- Roots hairs can absorb water from the soil.

……………………………………………………………………………………

3- Plant's root is branched and extended between the soil particles.

……………………………………………………………………………………

4- The age of root hairs does not exceed a few days.

……………………………………………………………………………………

5- The concentration of salt solution inside the root hair vacuole is higher than the concentration of soil solution.

……………………………………………………………………………………



❖ Transpiration process:

It is the losing of water in from of water vapour from the leaves or from other green parts to the surroundings through holes called stomata.

☒ Stomata:

- Stomata are widely spread on the lower surface of the plant leaves
- Each stoma is surrounding by tow guard cells.

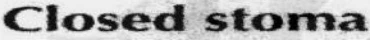
☒ The function of tow guard cells

- They change their shapes to control opening and closing the stoma.

☒ Importance of transpiration:

When the plant loses water, this creates pressure (a pulling force) that raises water to the top.





Open Stoma

A) Complete the following:

1- Plants can get rid of excess water through……………………..phenomena.

2- The………………… in the plant is surrounded by two guard cells.

3- The ………… process in the plant forms a pressure that raises water upward.

B) Write the scientific term:

1- Biological process through which plants loses water in the form of vapour.

2- Small holes that are widely spread on lower leaf surface.

3- Two cells that surrounded the leaf stomata.

C) Give reasons:

1- Presence of holes on the lower surface of plant leaves.

………………………………………………………………………………………

2- Each stoma is surrounded by two guard cells.

………………………………………………………………………………………